## REMARKS

### 35 U.S.C. § 112 Rejections

The Examiner has rejected claims 1, 3, 5-7, and 9-25 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Examiner stated that the specification alleges that the present invention can be practiced with only some of the aspects or without the specific details, that the order of the invention is irrelevant, and that repeated usage of the phrase "in one embodiment" does not necessarily refer to the same embodiment, although it may. The Examiner also stated that such statements in the specification are confusing and an attempt to add material which had not been expressly disclosed or properly incorporated. The Examiner further stated that the specification contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention without undo experimentation.

Applicant respectfully submits that the subject matter of the claims pending in the present application is described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. As mentioned by the Examiner, the instant claims recite: determining, translating, adjusting, monitoring, and reducing.

As described on pages 8 and 9 of the specification, BIOS 110 utilizes a combination of thermal characteristics and memory module design characteristics to determine a maximum sustainable power level for an integrated circuit, such as memory module 140. As described on page 10, once BIOS 110 determines the maximum sustainable power level for the integrated circuit, it translates this power level into a maximum performance characteristic. The maximum performance characteristic represents an average allowable sustained data transfer rate.

As described on pages 11 and 12, once the maximum performance characteristic of the integrated circuit is determined, the system adjusts operation of the integrated circuit so as to keep operating temperatures within a specified range. BIOS 110 monitors the total number of reads and writes experienced by memory module 140, and if the total number of reads and writes exceeds a threshold amount within a specified time frame, BIOS 110 decreases performance of the memory module 140.

Therefore, the determining, translating, adjusting, monitoring, and reducing cited in the claims, such as claim 1, is clearly described in the specification. Furthermore, as discussed in a previous response, Applicant respectfully submits that one skilled in the art would appreciate that not all of the specific details described in the specification are necessary to practice the present invention and that the operations described in the specification do not necessarily need to be performed in the order they are presented.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 1, 3, 5-7, and 9-25 under 35 U.S.C. § 112 first paragraph, as containing subject

matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention and as containing subject matter which not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention, and second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner has rejected claims 1, 3, 5-7, and 9-25 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner stated that statements that the present invention can be practiced with only some of the aspects or without the specific details, that the order of the invention is irrelevant, and that repeated usage of the phrase "in one embodiment" does not necessarily refer to the same embodiment, although it may, render the scope of the claims unascertainable.

Applicant respectfully submits that, as discussed above, the invention is invention is clearly described in the specification. As mentioned previously, the determining, translating, adjusting, monitoring, and reducing claimed is clearly described on pages 7 through 12 of the present specification.

Applicant has also noted that the Examiner cited MPEP § 2173.05 (d) in his discussion of the indefiniteness of the present claims. Applicant would like to

respectfully point out to the Examiner that MPEP § 2173.05 (d) indicates that descriptions of examples or preferences is properly set forth in the specification rather than the claims. Applicant respectfully submits that the present claims do not include and examples of preferences that are prohibited by MPEP § 2173.05 (d).

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 1, 3, 5-7, and 9-25 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

35 U.S.C. § 103 Rejections

The Examiner has rejected claims 1, 3, 5, 9-13 and 19-25 under 35 U.S.C. § 103(a) as being unpatentable over Bhatia or Lin in view of Hafizi, or Herbert, or Rankin.

Claims 1, 11, 15, and 19 include determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate. Specifically, claims 1, 11, 15, and19 include the limitations "determining...a maximum sustainable power level for an integrated circuit based upon environmental system characteristics and design characteristics," "translating the maximum sustainable power level into a...maximum allowable data transfer rate," and "adjusting operation of the integrated circuit such that the maximum allowable data transfer rate is not exceeded."

Bhatia teaches a system including a processor with a clock and a thermal management controller that monitors a temperature in the system and varies the

component between different performance states when an over-temperature condition is detected (Abstract). Referring to Figure 1, an example system 10 includes processors 12 and temperature sensor units 15 that monitor system temperature in one or more corresponding thermal zones (col. 3, lines 25-35). When the monitored temperature is above a particular temperature a thermal engage SMI is generated, and when the monitor temperature is below the particular temperature, a thermal disengage SMI is generated. The SMI may be generated at periodic intervals to allow software or firmware to manage the performance level of the processor (col. 3, lines 48-55). Bhatia thus teaches altering the performance of an integrated circuit based on sensed temperatures within different zones around the integrated circuit. Bhatia does not teach or suggest determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate.

Lin teaches an over-temperature protection method and its device for a central processing unit (Abstract). Figure 1 shows a flow chart of the over-temperature protection method for a CPU of the present invention, and on/off instruction, and an instruction for identifying the type of CPU are pre-stored in a read and write memory unit (BIOS) so that when operation of the computer is initiated 20, CPU 30 will directly read the above-mentioned instruction from the BIOS memory unit 10 and instruct a chip circuit 40 to operate, and at the same time energize on/off function circuit 50 (col. 2, lines 22-31). As the working temperature of the CPU 30 rises, the value of temperature sensing heat sensitive resistance 70 decreases linearly, and the potential of

the resistor connected to its one terminal will increase inversely proportional to a starting value as soon as the working temperature of the CPU 30 reaches a predetermined value (col. 2, lines 39-44). Lin thus discloses an over-temperature protection method for a central processing unit based on the temperature of various components within the unit. Specifically, Lin does not teach or suggest determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate.

Hafizi teaches the reliability of high-performance AlInAs/GaInAs heterojunction bipolar transistors. Devices with a base Be doping level of $5x10^{19}$ $cm^{-3}$ and a base thickness of approximately 50 nm displayed no sign of Be diffusion under applied bias. Excellent stability in DC current gain, device turn-on voltage, and base-emitter junction characteristics was observed. Accelerated life-test experiments were performed under an applied constant collector current density of $7x10^4$ $A/cm^2$ at ambient temperatures of 193, 208, and 328°C. Junction temperature and device thermal resistance were determined experimentally. Degradation of the base-collector junction was used as failure criterion to project a mean time to failure in excess of $10^7$ h at 125°C junction temperature with an associated activation energy of 1.92 eV. Hafizi does not teach or suggest determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate.

Herbert teaches a clock rate for a device that is controlled through the use of integrated circuits which respond to the temperature of the device (Abstract). Figure 1

depicts a diode-based temperature sensing circuit 10. When the current through diode D1 exceeds some threshold value at 16, as determined by the resistor divider network R2 and R3 output 18 of the comparator (differential amplifier 12) goes HIGH indicating that the threshold temperature has been reached (col. 3, lines 61-66). The output 18 of comparator 12 is used in the preferred embodiment as a control signal to select various clock rates (col. 3, line 66 - col. 4, line 1). Herbert thus teaches regulating the clock rates for integrated circuits based on temperatures within the device. Specifically, Herbert does not teach or suggest determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate.

Rankin teaches a method and apparatus for power throttling to manage the temperature of an integrated circuit (Abstract). A junction temperature for the integrated circuit is determined and compared to a thermal maximum value that is less than a predetermined value for the integrated circuit. Power consumption of the integrated circuit is reduced when the junction temperature reaches a predetermined value (col. 1, lines 37-42). Rankin thus teaches regulating the power to an integrated circuit based on the temperature of the integrated circuit. Specifically, Rankin does not teach or suggest determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate.

Applicant respectfully submits that Bhatia, Lin, Hafizi, Herbert, and Rankin individually, and in combination, teach adjusting the performance of an integrated

circuit based on a measured temperature. As discussed above, the present claims recite determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate. Thus, the present claims do not claim adjusting the performance of an integrated circuit based on the measured temperature of the circuit, but rather, on the design of the computing system.

Therefore, claims 1, 11, 15, and 19 are patentable over Bhatia or Lin in view of Hafizi, or Herbert, or Rankin because claims 1, 11, 15, and 19 include limitations that are not taught or suggested by Bhatia, Lin, Hafizi, Herbert, and Rankin.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 1, 3, 5, 9-13 and 19-25 under 35 U.S.C. § 103(a) as being unpatentable over Bhatia or Lin in view of Hafizi, or Herbert, or Rankin.

The Examiner has rejected claims 6-7 and 14-18 under 35 U.S.C. § 103(a) as being unpatentable over Bhatia or Lin in view of Hafizi, or Herbert, or Rankin, and further in view of Woo or Bogin.

Claims 6-7 and 14 are dependent on either claim 1 or claim 11 and should be allowable for the same reasons as claims 1 and 11 stated above.

Claim 15 includes determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate. Specifically, claim 15 includes the limitations "a unit to determine a sustainable power level for the integrated circuit based upon

environmental system thermal characteristics and design characteristics of the integrated circuit," "a unit to translate the sustainable power level into a data transfer rate," and "a unit to adjust operation of the integrated circuit such that the data transfer rate is not exceeded."

Woo teaches a memory system configured to provide thermal regulation of a plurality of memory devices. A controller determines an operating temperature of the memory device. Based on the determined operating temperature of the memory device, the controller further manipulates the operation of the memory system. (Abstract) Woo thus teaches regulating the performance of integrated circuits based on measured temperatures. Specifically, Woo does not teach or suggest determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate.

Bogin teaches a method for controlling core logic temperature (Abstract). When the access rate causes excessive temperatures, a throttling function is enabled. Thus, like the previous references, Bogin teaches regulating the performance of integrated circuits based on measured temperatures. Specifically, Bogin does not teach or suggest determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate.

As previously discussed, Bhatia, Lin, Hafizi, Herbert, and Rankin do not teach or suggest determining a maximum data rate based on characteristics of the integrated circuit and adjusting the operation of the integrated circuit to not exceed the maximum data rate.

Therefore, claim 15 is patentable over Bhatia, Lin, Hafizi, Herbert, and Rankin in view of Woo or Bogin because claims 15 includes limitations that are not taught or suggested by Bhatia, Lin, Hafizi, Herbert, Rankin, Woo, and Bogin.

Claims 16-18 are dependent on claim 15 and should be allowable for the same reasons as claim 15 stated above.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 6-7 and 14-18 under 35 U.S.C. § 103(a) as being unpatentable over Bhatia or Lin in view of Hafizi, or Herbert, or Rankin and further in view of Woo or Bogin.

Applicant respectfully submits that the present application is in condition for allowance. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call John P. Ward at (408) 720-8300.

Pursuant to 37 C.F.R. 1.136(a)(3), Applicant hereby requests and authorizes the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

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